IN THE SPECIFICATION:

Please amend the fourth full paragraph appearing on page 1 as follows:

Conventional solid composite propellant binders utilize cross-linked elastomers in which prepolymers are cross-linked by chemical curing agents. As outlined in detail in U.S. Patent No. 4,361,526, there are important disadvantages to using cross-linked elastomers as binders. Cross-linked elastomers must be cast within a short period of time after addition of the curative, which time period is known as the ~~"pot life".~~ "pot life." Disposal of a cast, cross-linked propellant composition is difficult, and usually is accomplished by burning, which poses environmental problems. Furthermore, current state-of-the-art propellant compositions have serious problems that include their use of nonenergetic binders which have lower performance and high end-of-mix viscosities.

Please amend the paragraph bridging pages 2 and 3 as follows:

In view of the inherent disadvantages associated with the use of cross-linked elastomeric polymers as binder materials, there has been considerable interest in developing thermoplastic elastomers suitable as binders for solid, high energy compositions. However, many thermoplastic elastomers fail to meet important requirements expected of propellant formulations, particularly the requirement of being processible below about 120°C, it being desirable that a thermoplastic elastomeric polymer for use as a binder in a high energy system have a melting temperature of between about 60°C and about 120°C. The melting temperature is desirably at least about 60°C because the propellant composition may be subject to somewhat elevated temperatures during storage and transport, and significant softening of the propellant composition at such elevated temperatures is unwanted. The setting of the melting temperature at not more than 120°C is determined by the instability, at elevated temperatures, of many components which ordinarily go into propellant compositions, particularly oxidizer particulates and energetic plasticizers. Many thermoplastic elastomers exhibit high melt viscosities which preclude high solids loading and many show considerable creep and/or shrinkage after processing. ~~Crosslinkable~~ Cross-linkable thermoplastic elastomers typically obtain their

thermoplastic properties from segments that form glassy domains which may contribute to physical properties adverse to their use as binders. Thermoplastic elastomers are block copolymers with the property of forming physical cross-links at predetermined temperatures. One thermoplastic elastomer, e.g., Kraton, brand TPE, obtains this property by having the glass transition point of one component block above room temperature. At temperatures below 109°C, the glassy blocks of Kraton form glassy domains and thus physically cross-link the amorphous segments. The strength of these elastomers depends upon the degree of phase separation. Thus, it remains desirable to have controlled, but significant, immiscibility between the two types of blocks, which is a function of their chemical structure and molecular weight. On the other hand, as the blocks become more immiscible, the melt viscosity increases, thus having a deleterious effect on the processibility of the material.

Please amend the third full paragraph appearing on page 3 as follows:

The thermoplastic materials proposed by the '613 patent involve elastomers having both (A) and (B) blocks, each derived from cyclic ethers, such as oxetane and oxetane derivatives and tetrahydrofuran (THF) and tetrahydrofuran derivatives. The monomer or combination of monomers of the (A) blocks are selected for providing a crystalline structure at usual ambient temperatures, such as below about 60°C, whereas the monomer or combination of monomers of the (B) blocks are selected to ensure an amorphous structure at usual ambient temperatures, such as above about -20°C. Typical of these materials is the random block copolymer ~~(poly(3-azidomethyl-3-methyloxetane) poly(3,3-bis(azidomethyl)oxetane),~~ (poly(3-azidomethyl-3-methyloxetane)-poly(3,3-bis(azidomethyl)oxetane), also known as poly(AMMO/BAMO).

Please amend the first full paragraph appearing on page 4 as follows:

Although the materials described by the ~~'613~~ '613 patent can be synthesized to exhibit acceptable mechanical properties for use as binders in explosive and propellant formulations, they have somewhat low densities. For example, poly(AMMO/BAMO) has a density of around

1.2 g/ml, with the precise value depending upon the proportions of A/B blocks. Additionally, the materials described by the ~~'613~~ '613 patent also have lower oxygen balance and energetic performance than other thermoset and thermoplastic energetic materials. The less than desirable oxygen balance and energy density of the thermoplastic elastomers disclosed by the ~~'613~~ '613 patent is a consequence of the use of polymer segments rich in unsymmetrical poly(3,3-disubstituted oxetane) or non-energetic polyether as the softer B block. The B block typically constitutes approximately 65-85% by weight of the thermoplastic elastomer.

Please amend the second full paragraph appearing on page 4 as follows:

It ~~would therefore~~ would, therefore, be a significant advancement in the art to provide energetic thermoplastic elastomer binders that are solid at room temperature and exhibit the excellent mechanical properties of the materials disclosed in the ~~'613~~ '613 patent, while possessing higher densities and improved oxygen balance and energetic performance.

Please amend the third full paragraph appearing on page 4 as follows:

~~It is, therefore, an object of this invention to provide~~ The present invention relates to a thermoplastic elastomer that addresses the aforementioned problems associated with the related art and realizes the advancement expressed above.

Please amend the paragraph bridging pages 4 and 5 as follows:

In accordance with the principles of this invention, these and other ~~objects~~ advantages are attained by the provision of an energetic thermoplastic elastomer binder that is in a solid state at room temperature and has A blocks and B blocks. The A blocks include one or more polyether(s) derived from monomers of oxetane derivatives and crystalline at temperatures below about 60°C. The B blocks include one or more polyether(s) derived from monomers of oxirane and its derivatives and amorphous at temperatures above about -20°C. The polyoxetane blocks A and polyoxirane blocks B may be linked by end-capping with diisocyanates and linking the

end-capped blocks with difunctional linking chemicals in which each of the two terminal functional groups are reactive with an isocyanate moiety of the diisocyanate.

Please amend the first full paragraph appearing on page 5 as follows:

~~It is also an object of this invention to provide~~ The present invention also relates to a method for the preparation of the above-described energetic thermoplastic binder ~~of this invention~~. In accordance with the principles of this invention, this and other ~~objects~~ advantages are achieved by a method in which hydroxyl-terminated polyoxetane A ~~blocks~~ blocks, which are crystalline at temperatures below about ~~60°C~~ 60°C, and hydroxyl-terminated polyoxirane B ~~blocks~~ blocks, which are amorphous at temperatures above about ~~-20°C~~ -20°C, are end-capped with a diisocyanate. The diisocyanate preferably has one isocyanate ~~moiety~~ moiety, which is more reactive, preferably at least about five times as reactive, with the terminal hydroxyl group of each of the blocks than the other isocyanate moiety, ~~whereby~~ wherein the more reactive isocyanate moiety tends to react with the terminal-hydroxyl groups of the blocks, leaving the less reactive isocyanate moiety free and unreactive. The end-capped A blocks and the end-capped B blocks are mixed together at approximately the stoichiometric ratios that the blocks are intended to be present in the energetic thermoplastic elastomer. The mixture is reacted with a linking compound having two isocyanate-reactive groups ~~which~~ that are sufficiently unhindered to react with the free and unreacted isocyanate groups of the end-capped blocks. In this manner, the ~~end-capped~~ end-capped blocks are linked, but not ~~crosslinked,~~ cross-linked, to form a thermoplastic elastomer.

Please amend the second full paragraph appearing on page 5 as follows:

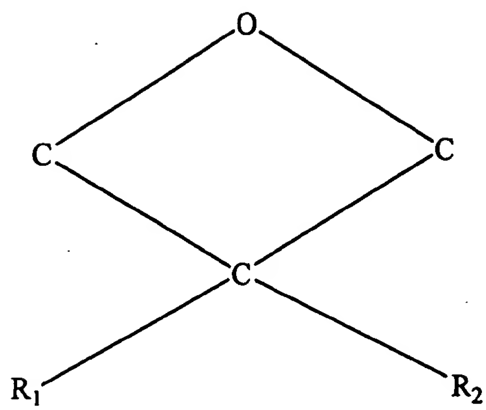
~~It is still a further object of this invention to provide~~ The present invention also relates to providing propellants, especially rocket propellants and gun propellants, explosives, gas generants, or the ~~like~~ like, containing the above-discussed energetic thermoplastic elastomer binder or made by procedures including the above-discussed method.

Please amend the paragraph bridging pages 5 and 6 as follows:

These ~~and other objects, features, and~~ advantages of the present invention will become apparent from the accompanying drawings and following detailed description which illustrate and explain, by way of example, the principles of the present invention.

Please amend the paragraph bridging pages 6 and 7 as follows:

The thermoplastic elastomer $(AB)_n$ polymers of this invention include A blocks ~~which~~ that are crystalline at temperatures below about 60°C, preferably at temperatures below about 75°C, and B blocks ~~which~~ that are amorphous at temperatures down to about -20°C. Each of the A and B blocks are polyethers derived from cyclic ethers. More specifically, the A blocks are derived from monomers of oxetane derivatives. The B blocks are derived from oxirane monomers and their derivatives, preferably energetic oxirane derivatives. The polymers melt at temperatures between about 60°C and about ~~120°C, and more preferably~~ 120°C and, more preferably, between about 75°C and about 100°C. The A and B blocks are mutually miscible in the melt. Consequently, the melt viscosity of the block copolymer decreases rapidly as the temperature is raised above the melting point, whereby high energy formulations may include high solids content, e.g., up to about 95% by weight of solid particulates, and can be easily processed. The invention also includes other thermoplastic elastomer block structures, such as ABA tri-block polymers and A_nB star polymers. Contributing to the miscibility of the A and B blocks is their similar chemical structure. Oxetane monomer units used in forming the A blocks of the present invention are generally ~~symmetrically substituted~~ symmetrically substituted oxetanes having the general formula:



wherein the R_1 and R_2 groups are preferably the same and are selected from moieties having the general formula: $-(CH_2)_nX$, where n is 0-10 and X is selected from the group consisting of -H, $-NO_2$, -CN, -Cl, -F, -O-alkyl, -OH, -I, $-ONO_2$, $-N(NO_2)$-alkyl, $-C\equiv CH$, -Br, -CH=CH(H or alkyl), $-CO_2$-(H or alkyl), -N(H or alkyl)$_2$, $-O-(CH_2)_{1,5}-O-(CH_2)_{0-8}-CH_3$, and N_3.

Please amend the first full paragraph appearing on page 7 as follows:

Examples of oxetane derivatives that may be used in forming the A blocks in accordance with this invention are generally ~~symmetrically-substituted~~ symmetrically substituted oxetanes including, but ~~are not~~ not limited to, the following: BEMO ~~(3,3-(bis(ethoxymethyl)oxetane),~~ (3,3-(bis(ethoxymethyl)oxetane), BCMO (3,3-bis(chloromethyl)oxetane), BMMO ~~(3,3-bis(methoxymethyl)oxetane),~~ (3,3-bis(methoxymethyl)oxetane), BFMO (3,3-bis(fluoromethyl)oxetane), BAOMO ~~(3,3-bis(acetoxymethyl)oxetane),~~ (3,3-bis(acetoxymethyl)oxetane), BHMO (3 ,3-bis(hydroxymethyl)oxetane), BMEMO (3,3-bis(methoxyethoxymethyl)oxetane), BIMO (3,3-bis(iodomethyl)oxetane), BNMO (3,3-bis(nitratomethyl)oxetane), BMNAMO ~~(3,3-bis(methylnitraminomethyl)oxetane),~~ (3,3-bis(methylnitraminomethyl)oxetane), and BAMO (3,3-bis(azidomethyl)oxetane).

Please amend the first full paragraph appearing on page 8 as follows:

Examples of energetic oxiranes that may be used in forming the B blocks in accordance with this invention include, but are not ~~limited to~~ limited to, glycidyl azide polymers ($C_3H_5N_3O$) (GAP), especially difunctional GAP, and poly(glycidyl nitrate) ($C_3H_5NO_4$) (PGN). These polymers have a glass transition temperature below about -20°C and are amorphous at temperatures above -20°C.

Please amend the second full paragraph appearing on page 9 as follows:

Thermoplastic elastomers produced in accordance with the present invention may be admixed with other components of a high energy formulation, such as a propellant formulation. The binder system, in addition to the thermoplastic elastomers, may optionally contain one or more plasticizers for improving the resistance of the thermoplastic elastomer to hardening at low temperatures, which may be included at a plasticizer-to-thermoplastic elastomer weight ratio of up to about 1:1. Suitable high energy plasticizers include glycidyl azide polymer (GAP), nitroglycerine, butanetriol trinitrate (BTTN), alkyl nitratomethyl nitramines, trimethylolethane trinitrate (TMETN), diethylene glycol dinitrate, triethylene glycol dinitrate (TEGDN), bis(dinitropropylacetal/-bis(dinitropropyl)formal (BDNPA/F), and mixtures thereof. Inert plasticizers ~~can~~ may also be used. Representative inert plasticizers include, by way of example, dioctyladipate (DOA), isodecylperlargonate (IDP), dioctylphthalate (DOP), dioctylmaleate (DOM), dibutylphthalate (DBP), oleyl nitrile, triacetin, and combinations thereof. The binder system may also contain a minor amount of a wetting agent or lubricant that enables higher solids loading.

Please amend the paragraph bridging pages 9 and 10 as follows:

The solids content of the high energy composition generally ranges from about 50 wt% to about 95 wt%, higher solids loading generally being preferred so long as such loading is consistent with structural integrity. The solids include fuel material particles and powders (collectively referred to herein as particulates), such as particulate aluminum, and/or oxidizer particulates. Representative

fuels include aluminum, magnesium, boron, and beryllium. Representative oxidizers and ~~co-oxidizers~~ co-oxidizers include ammonium perchlorate; hydroxylammonium nitrate (HAN); ammonium dinitramide (ADN); hydrazinium nitroformate; ammonium nitrate; nitramines such as cyclotetramethylene tetranitramine (HMX) and cyclotrimethylene trinitramine (RDX), ~~2,4,6,8,10,12-hexanitro-2,4,6,8,10,12-hexaazatetracyclo[5.5.0.0^{5,9}.0^{3,11}]-dodecane~~ 2,4,6,8,10,12-hexanitro-2,4,6,8,10,12-hexaazatetracyclo[5.5.0.0^{5,9}.0^{3,11}]-dodecane or ~~2,4,6,8,10,12-hexanitrohexaazaisowurtzitane~~ 2,4,6,8,10,12-hexanitrohexaazaisowurtzitane (CL-20 or HNIW), and/or ~~4,10-dinitro-2,6,8,12-tetraoxa-4,10-diazatetracyclo[5.5.0.0^{5,9},0^{3,11}]dodecane~~ 4,10-dinitro-2,6,8,12-tetraoxa-4,10-diazatetracyclo[5.5.0.0^{5,9},0^{3,11}]dodecane (TEX), and any combination thereof. In addition, the high energy composition may include minor amounts of additional components known in the art, such as bonding agents, burn rate modifiers, ballistic modifiers (e.g., lead), etc.

Please amend the first full paragraph appearing on page 10 as follows:

The thermoplastic elastomer may be mixed with the solids and other components of high energy formulation at temperatures above its melting temperature. Blending may be ~~done in~~ done in a conventional mixing apparatus. Because of the low viscosities of the molten polymer, no solvents are required for blending or other processing, such as extrusion.

Please amend the paragraph bridging pages 10 and 11 as follows:

An important advantage of having a binder which is meltable is that the elastomer from an outdated device containing the elastomer can be melted down and reused. At the time of such remelting, the binder might be reformulated, e.g., by addition of additional fuel or oxidizer particulates. Accordingly, the thermoplastic elastomer provides for its eventual recycle, as opposed to the burning required for disposal of cross-linked compositions. Because the "pot life" of the thermoplastic propellant exceeds that which would reasonably be required of a propellant or explosive formulation, if any problems develop during casting, the process can be

delayed as long as is reasonably necessary, merely by maintaining the formulation in a molten state.

Please amend the first full paragraph appearing on page 11 as follows:

The oxetane homopolymer blocks may be formed according to the cationic polymerization technique taught by Manser in U.S. Patent No. 4,393,199, the complete disclosure of which is incorporated herein by reference. The oxirane homopolymer blocks may be formed according to the technique taught in U.S. Patent No. 5,120,827, the complete disclosure of which is incorporated herein by reference. The technique employs an adduct of a substance such as a diol, e.g., 1,4-butane diol (BDO), and a catalyst for cationic polymerization, e.g., BF_3-etherate. This adduct forms with the oxetane monomer being an initiating species ~~which~~ that undergoes chain extension until n moles of monomer have been incorporated in the molecule, n being the ratio of monomers to adduct present. By adjusting the ratio of monomers to adduct present, the average molecular weight of the polymer ~~which~~ that forms may be adjusted. If two or more monomers are present, incorporation of the monomers will be generally random but may depend upon the relative reactivities of the monomers in the polymerization reaction.

Please amend the third full paragraph appearing on page 11 as follows:

It is understood that although the isocyanate-reactive terminal functional groups of the blocks are referred to herein as being hydroxyl groups, the ~~isocyanate-reactive~~ isocyanate-reactive functional groups may also be amines, amides, and/or carboxyl groups.

Please amend the second full paragraph appearing on page 12 as follows:

Oxetane and oxirane polymer blocks normally have terminal ~~isocyanate-reactive~~ isocyanate-reactive (e.g., hydroxyl) functions which are end-capped with the diisocyanates in accordance with the invention. Preferably, a first of the isocyanate moieties

of the end-capping compound is substantially more reactive with the terminal-hydroxyl moieties of the polymer blocks than the other (second) isocyanate moiety. One of the problems with linking these types of polymer blocks is that substituted ~~oxetane-derived~~ oxetane-derived hydroxyl end groups units have neopentyl structures, whereby the terminal primary hydroxyl moieties are substantially hindered and therefore less reactive. The blocks derived from oxirane derivatives are secondary alcohols, making their hydroxyl groups less reactive than the primary hydroxyl group of the oxetane-derived A-block. The diisocyanate preferably is selected so that the first of the isocyanate moieties is capable of reacting with a hydroxyl-group of the polymer blocks while the second isocyanate moiety remains free and unreacted. Diisocyanates are preferably used because isocyanates of higher functionality would result in undesirable levels of cross-linking. The different reactivities of the isocyanate ~~moieties is~~ moieties are desirable to ensure that substantial chain extension through linking of like blocks does not occur. Thus, for purposes of this invention, one isocyanate moiety of the diisocyanate should preferably be approximately five times more reactive with terminal hydroxyl groups of oxetane and oxirane blocks than the other group. Preferably one isocyanate moiety is at least about ten times more reactive than the other.

Please amend the paragraph bridging pages 13 and 14 as follows:

In one ~~variant~~ embodiment, the A blocks and B blocks are reacted separately with the diisocyanate, so that there is no competition of the blocks for diisocyanate molecules and each separate end-capping reaction may be carried to substantial completion. The diisocyanate may react more rapidly with one block than the other, but this difference ~~can~~ may be compensated for by a longer reaction time with the slower reacting block. The reactivity of the terminal hydroxyl groups varies according to steric factors and also according to side-chain moieties. Energetic oxetanes, for example, generally have side-chain moieties that are electron-withdrawing, making their terminal hydroxyl groups less reactive. Once end-capped with diisocyanate, the reactivities of the polymers for linking purposes is essentially dependent only upon the reactivity of the free isocyanate, not on the chemical makeup of the polymer chain itself. Thus end-capped (A) blocks

are substantially as reactive as end-capped (B) blocks. The end-capping of the oxirane blocks in this manner overcomes the problems associated with linking of oxirane derivative blocks, which have secondary hydroxyl groups.

Please amend the first full paragraph appearing on page 14 as follows:

The end-capping reaction and linking reaction are carried out in a suitable solvent, e.g., one which dissolves the polymer and does not react with the free isocyanate moieties. In a preferred embodiment, the solvent is non-halogenated. Although insubstantial amounts of halogenated solvent may be present, the solution is preferably completely free of any halogenated solvent. The non-halogenated solvent should not react in the urethane reaction ~~(i.e., do~~ (i.e., should not interfere with the end capping catalyst, such as dibutyl tin dilaurate, or the linking catalyst) and forms an azeotrope with water. The solvent or solvents selected preferably are capable of dissolving more than 25% by weight of the blocks (based on total weight of the solvents and blocks) into solution, more preferably at least 35% by weight into solution, and still more preferably 50% by weight into solution. Representative solvents include cyclic ethers such as tetrahydrofuran (THF) and 1,4-dioxane; non-cyclic ethers such as ethylene glycol dimethyl ether; ketones such as methyl ethyl ketone (MEK); and esters such as ethyl acetate. Of these, THF is preferred because of its excellent solubility characteristics.

Please amend the paragraph bridging pages 14 and 15 as follows:

In ~~a preferred~~ one embodiment, the solvent forms an azeotrope with water. In this ~~preferred~~ embodiment, after the blocks are dissolved in excess non-halogenated solvent, the solution may be dried by azeotropic distillation of the solvent, and optionally further concentrated, e.g., via distillation, in the solution to increase the volumetric loading and reaction rate. The blocks then may be end-capped, separately or together, and linked in the same or a different non-halogenated solvent. By distilling off excess solvent to remove water, subsequent reaction with a diisocyanate may proceed without significant interference from competing reactions between the isocyanate moieties and water. Additionally, the solution remains

homogeneous and further distillation serves to concentrate the polymer solution, producing higher reaction rates and requiring less reactor capacity. The reaction rates may be improved by conducting the end-capping reaction at elevated temperatures, such as 30°C to 80°C, more preferably 40°C to 60°C. The process may be conducted by a batch or continuous method. For example, the prepolymer and catalyst may be continuously fed through a mixer/extruder into which is injected a diisocyanate and a diol at appropriate feed rates so that urethane linking occurs within the extruder and energetic thermoplastic elastomer is continuously produced for processing.

Please amend the first full paragraph appearing on page 15 as follows:

Suitable catalysts for promoting the end-capping reaction include, as a preferred class, organic tin compounds with at least one and preferably two labile groups, such as chloride or acetate, bound directly to the tin. Suitable tin ~~catalyst~~ catalysts include diphenyl tin dichloride, dibutyl tin dichloride, dibutyl tin dilaurate, dibutyl tin diacetate. Tertiary amine catalysts may also be used.

Please amend the sixth full paragraph appearing on page 17 as follows:

For the following experiments, poly(azidomethyloxirane) was supplied by 3M ~~Speciality~~ Specialty Chemicals of St. Paul, MN (Lot L-12564). Unless otherwise specified, all other materials were obtained from Aldrich of Milwaukee, WI.

Please amend the paragraph bridging pages 18 and 19 as follows:

A 5 liter jacketed flask equipped with a mechanical stirrer was charged with 1062 grams of sodium azide, 1972 ml of water, and 2450 grams of ~~3-bromomethyl-3-methyloxetane~~ 3-bromomethyl-3-methyloxetane (supplied by AmeriBrom, Inc. of New York). This mixture was brought to reflux with vigorous mixing. After 48 hours the mixture was cooled to room temperature. The organic layer was separated off and washed

three times with 1000 ml of water before being dried over molecular sieves to yield pure ~~3-azidomethyl-3-methyloxetane~~ 3-azidomethyl-3-methyloxetane in 85% yield.

Please amend the paragraph bridging pages 19 and 20 and the section title directly preceding it as follows:

EXAMPLE 3 (Random block copolymer of poly(azidomethyloxirane) and ~~poly(3,3-bis(azidomethyl)oxetane))~~ poly(3,3-bis(azidomethyl)oxetane))

In a 250 ml round bottom flask, 19.62 grams of dry difunctional poly(azidomethyloxirane) with a hydroxyl equivalent weight of 1269 and 6.63 grams of dry poly(3,3-bis(azidomethyl)oxetane) with a hydroxyl equivalent weight of 3017 were dissolved in 80 ml of dry methylene chloride. The solution was concentrated by evaporation of the methylene chloride via a rotovapor until the solution became cloudy. To this solution, 0.12 ml of dibutyltin dilaurate and 3.11 grams of ~~toluene-2,4-diisocyanate~~ toluene-2,4-diisocyanate were added while stirring with a magnetic-driven stirrer at ambient temperature and pressure. After four hours, 0.805 grams of butane-1,4-diol was added, causing the solution to become steadily more viscous. After another 18 hours, the solution was too viscous to stir with the magnetic-driven stirrer and it was diluted with 50 ml of methylene chloride before being poured into methanol in a volume ratio of 1:5. The methanol was decanted off, and the precipitated polymer was washed three times with fresh methanol (1:5 volume ratio) to give a rubbery granular product with the following properties:

Mn = 28440

Mw = 219500

Mw/Mn = 7.7

$E^{1.0}$ (psi) = 511

ϵm (%) = 251

ϵ_f (failure) (%) = 269

σ_m (psi) = 194

σ_m (corrected) (psi) = 702

ShoreA = 52

Density = 1.31 g/cm^3

Please amend the first full paragraph appearing on page 20 as follows:

($E^{1.0}$ represents Young's Modulus. ϵ_m and ϵ_f, respectively representing maximum measured strain and calculated failure strain, and σ_m and σ_m (corrected), respectively representing measured maximum stress and calculated corrected maximum stress, were measured using an INSTRON model 1225. The ~~crosshead~~ cross-head speed was 0.6 inches per minute. Measurements were made at room temperature using 20 mm x 4 mm dumbell samples. ShoreA representing hardness was measured on a Shore Conveloader at room temperature.)

Please amend the paragraph bridging pages 20 and 21 and the section title directly preceding it as follows:

EXAMPLE 4 (Random block copolymer of poly(nitratomethyloxirane) and ~~poly(3,3-bis(azidomethyl)oxetane))~~ poly(3,3-bis(azidomethyl)oxetane))

In a 100 ml round bottom flask, a dried solution of 22.69 grams of difunctional poly(nitratomethyloxirane) (supplied by Thiokol of Elkton, Md., now Cordant Technologies Inc.) with a hydroxyl equivalent weight of 1285 and 9.73 grams of poly(3,3-bis(azidomethyl)oxetane) with a hydroxyl equivalent weight of 3017 was dissolved in 45 ml of dry methylene chloride. The solution was concentrated by evaporation of the methylene chloride via a rotovapor until the solution became cloudy. To this solution, 0.152 ml of dibutyltin dilaurate and 3.637 grams of ~~toluene-2,4-diisocyanate~~ toluene-2,4-diisocyanate were added and stirred with a magnetic-driven stirrer at ambient temperature and pressure. After three days, 0.941 grams of butane-1,4-diol was added, causing the solution to become steadily more viscous. After one more day, the solution was too viscous to stir with the magnetic-driven stirrer, and was diluted with 30 ml of methylene chloride and 4 ml of methanol before being poured into methanol in a volume ratio of 1:5. The methanol was

decanted off, and the precipitated polymer was washed three times with fresh methanol (1:5 volume ratio) to give a rubbery granular product with the following properties:

Mn = 15020

Mw = 105900

Mw/Mn = 7.1

$E^{1.0}$ (psi) = 581

ϵ_m (%) = 325

ϵ_f (failure) (%) = 358

σ_m (psi) = 182

σ_m (corrected) (psi) = 806

ShoreA = 58

Density = 1.42 g/cm^3

Please amend the paragraph bridging pages 21 and 22 and the section title directly preceding it as follows:

EXAMPLE 5 (Random block copolymer of poly(azidomethyloxirane) and ~~poly(3,3-bis(azidomethyl)oxetane))~~ poly(3,3-bis(azidomethyl)oxetane))

In a 250 ml round bottom flask, a dry solution of 15.0 grams of difunctional poly(azidomethyloxirane) with a hydroxyl equivalent weight of 1174 and 5.0 grams of poly(3,3-bis(azidomethyl)oxetane) with a hydroxyl equivalent weight of 1626 was dissolved in 60 ml of tetrahydrofuran. The solution was concentrated by evaporation of the tetrahydrofuran via a rotovapor until 6.6 grams of solvent remained. To this solution, 1 ml of dibutyltin dilaurate was added and the solution was warmed to 50°C. The solution was stirred with a magnetic-driven stirrer and 2.76 grams of ~~toluene-2,4-diisocyanate~~ toluene-2,4-diisocyanate were added. After four minutes, 0.714 grams of butane-1,4-diol was added, causing the solution to become more viscous rapidly. After another 2 minutes, the solution was quenched by adding a solution of 2 ml of methanol in 30 ml of tetrahydrofuran. This solution was then poured into

methanol in a volume ratio of 1:5. The methanol was decanted off, and the precipitated polymer was washed three times with fresh methanol (1:5 volume ratio) to give a rubbery granular product with the following properties:

Mn = 21420

Mw = 298500

Mw/Mn = 14

$E^{1.0}$ (psi) = 271

ϵ_m (%) = 161

ϵ_f (failure) (%) = 178

σ_m (psi) = 100

σ_m (corrected) (psi) = 256

ShoreA = 41

Please amend the section title appearing on page 22 at lines 17-18 as follows:

EXAMPLE 6 (Random block copolymer of poly(azidomethyloxirane) and ~~poly(3,3-bis(azidomethyl)oxetane))~~ poly(3,3-bis(azidomethyl)oxetane))

Please amend the paragraph bridging pages 22 and 23 as follows:

In a separate 250 ml round bottom flask, 17.94 grams of dry difunctional poly(azidomethyloxirane) with a hydroxyl equivalent weight of 1174 and 6.63 grams of dry poly(3,3-bis(azidomethyl)oxetane) with a hydroxyl equivalent weight of 2390 were dissolved in 100 ml of tetrahydrofuran. The solution was concentrated and dried by evaporation of the tetrahydrofuran via a rotovapor under reduced pressure until 20 grams of solvent remained. To this solution, 0.75 ml of dibutyltin dilaurate and 3.097 grams of toluene-2,4-diisocyanate were added while stirring with a magnetic-driven stirrer. After 1 ~~hours,~~ hour, the urethane oligomer was added to this solution, causing it to become steadily more viscous. After 20 minutes, the solution was too viscous to stir with the magnetic-driven stirrer and it was diluted with 20 ml of

dry tetrahydrofuran, and then allowed to react for a further 20 minutes before being poured into methanol in a volume ratio of 1:5. The precipitated polymer was washed three times with fresh methanol (1:5 volume ratio) to give a rubbery granular product with the properties shown in FIGS. 1 and 2 and set forth below:

Mn = 26240

Mw = 175500

Mw/Mn = 6.69

Please amend the first full paragraph appearing on page 23 as follows:

Molecular weight distribution was determined by gel permeation ~~chromotography~~ chromatography using polystyrene standards, with the results shown in FIG. 1. The GPC trace in FIG. 1 demonstrates that the prepolymers were linked to produce a copolymer having a higher molecular weight and dispersivity than the homopolymer blocks. The DMA trace in FIG. 2 shows the melt transition of random block $(BAMO\text{-}GAP)_n$ at 75-80°C with a material modulus reducing only slowly before this point.